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Course outline

About NPTEL ()

How does an NPTEL online course work? ()

Week 0 ()

Practice: Week 0 : Assignment 0 (assessment?name=154)

Week 1 ()

Week 0 : Assignment 0

Your last recorded submission was on 2024-07-20, 20:05 IST

1) Look at the following truth table *1 point*

A	B	A op B
F	F	T
F	T	F
T	F	F
T	T	F

Which binary operation has been carried out?

a) $\neg A \vee B$

b) $\neg (A \vee B)$

c) $\neg (A \wedge B)$

d) $\neg A \wedge B$

- ○ a
- ○ b
- ○ c
- ○ d

2) *1 point*

Consider the following array of seven integers:
30, 15, 10, 40, 25, 20, 12
What will be the contents of this array after the 2nd pass of bubble sort (sorting from smallest to largest)?

a) 15, 10, 30, 25, 20, 12, 40

b) 10, 12, 15, 25, 20, 30, 40

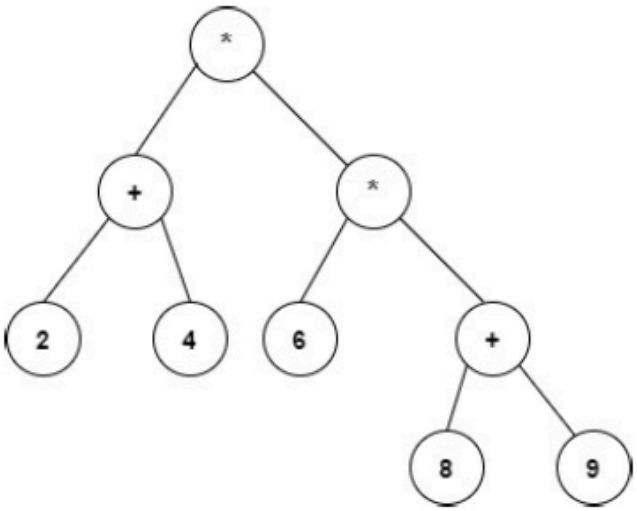
c) 10, 15, 25, 20, 12, 30, 40

d) 10, 12, 15, 20, 25, 30, 40

- ○ a
- ○ b
- ○ c
- ○ d

3) ***1 point***

Identify the correct representation of the prefix expression of the given tree below.



a) $*2+4*6+8\ 9$

b) $2+4*6*8+9$

c) $2\ 4+6\ 8\ 9+**$

d) $*+2\ 4*6+8\ 9$

- ○ a
- ○ b
- ○ c
- ○ d

4) **1 point**

Consider a set X = { {a, b}, {c, d}, {e, f} }. What is the number of elements in the power set of X?

a) 4

b) 8

c) 12

d) 16

- ○ a
- ○ b
- ○ c
- ○ d

5) **1 point**

When an ODD decimal number is converted into a binary number, what will be the the Least Signaficant Bit(LSB)?

a) 0

b) 1

c) either 0 or 1

d) only 11

- ○ a
- ○ b
- ○ c
- ○ d

6) **1 point**

Consider the following arrays of numbers. Which one represents a min-heap?

a)

20	5	15	10	6	8	9

b)

20	10	15	5	6	8	9

c)

9	6	10	8	5	15	20

d)

5	6	10	8	9	15	20

- ○ a
- ○ b
- ○ c
- ○ d

7) **1 point**

Consider two sets A and B. Which of the following statement is are true?

a) $A - B = A \cap B$

b) $A - B = A - (A \cap B)$

c) $A \cap B = A \cup (A \cap B)$

d) $A \cap B = A \cap (A \cap B)$

- ☐ a
- ☐ b
- ☐ c
- ☐ d

8) **1 point**

Let a given function be f: I→ I given by $f(x) = x^2$ where I stands for the set of all integers. Which of the following statements is/are true?

a) It is a one-one function but not onto.

b) It is an onto function but not one-one.

c) It is both one-one and onto.

d) It is neither one-one nor onto.

- ○ a
- ○ b
- ○ c
- ○ d

9) **1 point**

Consider the following:
CSE(x): The girl x is in CSE department.
NLP(x): The girl x studies NLP.

Which of the following formula represents "Not all CSE students study NLP."

a) $\forall$(x) (CSE(x) $\wedge \neg$NLP(x))

b) $\forall$(x) ($\neg$CSE(x) $\rightarrow$ NLP(x))

c) $\exists$(x) ($\neg$CSE(x) $\rightarrow$ NLP(x))

d) $\exists$(x) (CSE(x) $\wedge \neg$NLP(x))

- ○ a
- ○ b
- ○ c
- ○ d

10) ***1 point***

Consider the binary relation $S_1 = \{(1, 1), (2, 2), (1, 2), (2, 1)\}$ on the set $\{1, 2\}$. Identify the correct statement.

a) S_1 is reflexive.

b) S_1 is symmetric.

c) S_1 is not transitive.

d) S_1 is antisymmetric.

- ☐ a
- ☐ b
- ☐ c
- ☐ d

11) ***1 point***

What is the domain of the following function if the range is the set of real numbers?

$$\frac{5}{\sqrt{x^2-9}}$$

a) $(-\infty, -3) \cup (-3, \infty)$

b) $(-\infty, 3) \cup (3, \infty)$

c) $(3, \infty) \cup (-\infty, -3)$

d) $(-3, 3)$

- ○ a
- ○ b
- ○ c
- ○ d

12) ***1 point***

How many functions are there from the set $\{1, 2, 3\}$ to the set $\{a, b\}$?

a) 9

b) 8

c) 6

d) 5

- ○ a
- ○ b
- ○ c
- ○ d

13) ***1 point***

If U is the set of integers excluding zero, V is the set of even integers, and D is the set of odd integers, which of the following statement(s) is (are) true. Note: Here $\overline{E}$ denotes complement over the expression E. U is the Universal set

a) $V \cup D = U$

b) $U - V = D$

c) $\bar{V} = D$

d) $V - D = \{0\}$

- [ ] a
- [ ] b
- [ ] c
- [ ] d

14) ***1 point***

Suppose that A and B are two sets. Which of the following is always equivalent to $A \cap B$

a) $(A - B) \cup (B - A) \cup (A \cap B)$

b) $(A - B) \cup (B - A)$

c) $A - (A - B)$

d) $B - (B - A)$

- [ ] a
- [ ] b
- [ ] c
- [ ] d

15) ***1 point***

Consider the following function from {a,b,c,d} to {1,2,3,4,5}.
{(a,2), (b,1), (c,3), (d,4)}
Which of the following is true about the function?

a) The function is bijective

b) The function is injective, but not surjective

c) The function is surjective, but not injective

d) The function is neither injective nor surjective

- ( ) a
- ( ) b
- ( ) c
- ( ) d

16) ***1 point***

Numbers 1, 2, 3, 4 are pushed into a stack in that order but these four PUSH operations are intermixed with POP operations as well. Whenever a number is popped, it is printed. Which of the following permutation can be printed by such PUSH and POP operations?

a) 3, 4, 1, 2

b) 1, 4, 2, 3

c) 4, 2, 3, 1

d) 3, 2, 4, 1

- ○ a
- ○ b
- ○ c
- ○ d

17) ***1 point***

Which one of the following is the most appropriate logical formula to represent the statement? "Red and Yellow cars are beautiful".
The following notations are used:
R(x): x is a Red car
Y(x): x is a Yellow car
B(x): x is beauiful
Note: $\forall x$ denotes for all x. $\exists x$ denotes for some x (atleast 1).$\rightarrow$ denotes implication. $\vee$ and $\wedge$ denotes OR and AND operation respectively.

a) $\exists x(R(x) \vee Y(x)) \rightarrow B(x)$

b) $\exists x(R(x) \wedge Y(x)) \rightarrow B(x)$

c) $\forall x(R(x) \vee Y(x)) \rightarrow B(x)$

d) $\forall x(R(x) \wedge Y(x)) \rightarrow B(x)$

- ○ a
- ○ b
- ○ c
- ○ d

18) ***1 point***

Consider a B+-tree of order 5. What is the minimum number of children a root node can have, considering it is not the only node in the tree?

a) 5

b) 6

c) 2

d) 1

- ○ a
- ○ b
- ○ c
- ○ d

19) ***1 point***

A hash table with length of 10 elements use open addressing with hash function h(k)=k mod 10, and linear probing. the table shows the state after insertion of 6 values. Identify a possible order in which the key values could have been inserted in the table.

0	
1	
2	22
3	43
4	14
5	62
6	96
7	103
8	
9	

a) 96, 22, 14, 62, 43, 103

b) 14, 22, 43, 62, 103, 96

c) 22, 96, 43, 103, 14, 62

d) 96, 14, 22, 43, 62, 103

- ○ a
- ○ b
- ○ c
- ○ d

20) ***1 point***

How many comparisons does it take to find the element 10 in the sorted array A = {10,15,17,19,20} using binary search?

a) 2

b) 3

c) 5

d) 6

- ○ a
- ○ b
- ○ c
- ○ d

Check Answers and Submit